

# Draft guideline

## Calculation of avoided distribution costs

### Network Demand Management Consultation Working Group

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#### 1 Introduction

The Independent Pricing and Regulatory Tribunal of New South Wales (the Tribunal) currently regulates pricing for electricity distribution services in NSW under the National Electricity Code. On 11 June 2004, the Tribunal released a final report (the “report”) and final determination (the “determination”) in relation to network pricing over the period 1 July 2004 to 30 June 2009.

The report and determination set out actions and decisions designed to provide incentives for *network* demand management. These decisions include introducing a D-factor into the weighted average price cap (WAPC) control formula to allow the distribution network service providers (DNSPs) to recover, amongst other things, approved non-tariff based implementation costs up to a maximum value equivalent to the expected avoided distribution costs.

The determination includes a definition of avoided distribution costs but does not set out a methodology for calculating avoided distribution costs for the purposes of the D-factor.

Greater clarity on calculating avoided distribution costs will facilitate implementation of the D-factor mechanism and assist stakeholders to assess the feasibility of demand management projects. Therefore, in October 2004 the Tribunal established a demand management consultation group to develop principles and guidelines on a number of matters, including principles for the calculation of avoided distribution costs.

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#### 2 Purpose and scope of guideline

This guideline has been prepared to facilitate implementation of the D-factor demand management arrangements and, in particular, to provide clarity for DNSPs and demand management service providers in respect of the Tribunal’s evaluation of *avoided distribution costs* under the determination.

The guideline is limited to the methodology for estimating avoided distribution costs in the context of the determination and the D-factor adjustment. The guideline does not consider assessment of avoided distribution costs from the perspective of project feasibility, DNSP network planning or societal cost/benefit.

In particular, the determination establishes a narrow definition for the term “avoided distribution costs” and sets out how the “approved” value of this term then caps the allowed recovery of non-tariff demand management costs.

- Definition: *Avoided Distribution Costs resulting from a DNSP’s Non-Tariff Demand Management Measures for a Year means the expected change in the Present Value of the DNSP’s operating costs and capital expenditure resulting from the deferral or postponement (temporarily or indefinitely) of expenditure on the DNSP’s Distribution System as a result of those measures.*<sup>1</sup>

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<sup>1</sup> NSW Electricity Distribution Pricing 2004/05 to 2008/09, Determination No 2, 2004, June 2004, Annexure 1 definitions and interpretation.

- Application: *The DNSPs [are allowed] to recover approved non-tariff-based demand management implementation costs, up to a maximum value equivalent to the expected avoided distribution costs.*<sup>2</sup>

This guideline is structured as follows:

**Table 1 – Structure of guideline**

Ref	Section	Details
3	Context	Provides information and extracts from the determination and final report that significantly affect the approach to calculating avoided distribution costs and this guideline
4	Issues considered	Summarises a number of points raised and issues considered in the course of developing the guideline
5	Principles and methodology	Sets out the principles on which the avoided distribution cost calculation is based, the formula for calculation of avoided distribution costs and, where necessary, clarifies the definition of the parameters in the formula
6	Examples	Provides worked examples to illustrate how the formula is applied to potential non-tariff demand management projects
7	D Factor approval process – avoided distribution costs – year t	Summarises (in the form of a diagram) key elements of the approval process related to avoided distribution costs

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### 3 Context

The D-factor arrangements aim to neutralise barriers to demand management associated with the regulatory framework of network pricing and to provide positive support for network demand management initiatives.

The D-factor set out in the determination seeks to neutralise any potential disincentive for demand management created by the change to a WAPC form of regulation (which links revenue to volumes sold and therefore may discourage rather than encourage demand management).

The detailed formula for the D-factor arrangements allows DNSPs to pass through non-tariff demand management implementation costs and be compensated for any revenue lost during the current regulatory period. The Tribunal believes that this treatment is consciously generous and is warranted, at least in the short-term, to help overcome the barriers to greater use of demand management initiatives and support the emergent market for these solutions.

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<sup>2</sup> NSW Electricity Distribution Pricing 2004/05 to 2008/09 Final Report, p 90.

### 3.1 Tribunal's determination and final report

The Tribunal's determination and final report on NSW Electricity Distribution Pricing 2004/05 to 2008/09 sets out the Tribunal's decisions associated with providing incentives for network demand management.

Extracts of the determination and final report of particular relevance to this guideline are set out in Table 2 and Table 3 respectively (see section 7 for the Tribunal's approval process).

**Table 2 – Determination references**

Reference	Details
<b>Annexure 1- Definition of avoided distribution costs and Non-Tariff Demand Management Measures</b>	<p><b>Avoided distribution costs</b> resulting from a DNSP's Non-Tariff Demand Management Measures for a Year means the expected change in the Present Value of the DNSP's operating costs and capital expenditure resulting from the deferral or postponement (temporarily or indefinitely) of expenditure on the DNSP's Distribution System as a result of those measures.</p> <p><b>Non-Tariff Demand Management Measures</b> means any action, project or activity undertaken by or on behalf of a DNSP, either independently or in conjunction with any other persons (such as generators, retail suppliers, energy service intermediaries and end-use customers), with the objective of reducing the costs of providing Prescribed Distribution Services by altering the level or pattern of consumption of energy, the source of energy, or the use of the DNSP's Distribution System, but excluding:</p> <p>(1) Tariff Demand Management Measures; and</p> <p>(2) any activities which expand the Distribution System or its capacity or which renew, repair or maintain it.</p>
<b>Annexure 1</b>	<p><b>Present Value</b> of any cost or expenditure of a DNSP has the meaning set out in clause 2.4 of this annexure.</p> <p><b>2.4 Present Value</b></p> <p>In this Determination, unless the context otherwise requires, a reference to the Present Value of any cost or expenditure of a DNSP means the present value of that cost or expenditure calculated using a discount rate equivalent to the Rate of Return.</p> <p><b>2.3 Rate of Return</b></p> <p><b>In this Determination, unless the context otherwise requires, a reference to the Rate of Return on capital of a DNSP means 7% if cashflows are expressed in real pre-tax terms, and 9.7% if cashflows are expressed in nominal pre-tax terms.</b></p>

**Table 3– Final Report references**

Reference	Details
<b>Section 8.3.1 DNSPs can recover non-tariff-based demand management implementation costs</b>	<p>The Tribunal has decided that it is appropriate to limit the pass through of non-tariff demand management implementation costs to a maximum amount that is equivalent to the avoided distribution costs expected to result from that demand management project. It considers its regulatory treatment should support only efficient demand management projects — that is, those that generate a net cost saving. It does not consider that it is appropriate for customers to fund demand management costs in excess of the avoided distribution costs.</p> <p>To recover the full implementation costs of any demand management project, the DNSP will be required to demonstrate that these costs in present value terms are less than or equal to the avoided distribution costs expected to result from the project.</p>

Reference	Details
	<p>This should not be an onerous requirement, as DNSPs are likely to undertake this analysis as part of the standard process for developing a business case for demand management options.</p> <p>The Tribunal will allow recovery of demand management implementation costs on an annual basis. The estimate of the avoided distribution costs used to cap the pass through of these costs for a particular project will be held constant in real terms at its initial value. The initial value will be the value the DNSP submits to the Tribunal in the first year it claims the pass through of these costs. If the project is implemented over several years, the DNSP will be able to claim the pass through of costs incurred each year until the total amount claimed reaches the expected avoided distribution cost amount in present value terms.</p> <p>Fixing the cap at the expected avoided distribution cost amount should also reduce the risks to DNSPs should a project fail to deliver the expected deferral benefits. For example, EnergyAustralia noted that if a DNSP undertook a demand management project but failed to sign up enough demand reduction to justify the deferral of capital expenditure, it would incur both the demand management costs and the capital expenditure. While the Tribunal does not have full details of the project EnergyAustralia has in mind, it expects that in such circumstances the DNSP would be able to pass through the demand management costs on the basis that there was a demonstrated expected deferral if the project had been successful.</p>

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## 4 Issues considered in developing guideline

### 4.1 Costs included in cost streams

The determination defines avoided distribution costs in terms of operating costs and capital expenditure cost streams. Consistent with this definition, the costs included in the formula are limited to operating costs and capital expenditure items that are deferred or avoided as a result of the non-tariff demand management measures. The value of depreciation avoided is not included in this definition, even though DNSPs may include depreciation as an avoidable cost in developing their business cases for demand management initiatives.

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### 4.2 Selection of time-period to calculate present value

The time-period over which cost streams are considered could affect the present value of the avoided distribution costs.

One approach would be to set the time-period sufficiently long to capture the full effect of the non-tariff demand management measure on capital expenditure and operating cost cashflows. However, where the measure results in deferral of capital expenditure, the effect of the deferral could continue into perpetuity (assuming the asset is replaced at the end of its life etc).

A default time-period of 15 years is recommended by this guideline. This time-period is consistent with DNSP planning practices and does not impose significant additional administrative costs.

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### **4.3 Consistency of cost estimates**

Calculation of the avoided distribution costs is based on comparison of estimates for two cost streams: a cost stream with demand management and a cost stream without demand management. The assumptions used to derive the estimates for the two cost streams need to be consistent; for example, they need to be based on the same network planning standards and developed using the same network planning approach. This also means that the estimates will be based on the same underlying probabilistic or deterministic planning assumptions: for example, growth assumptions.

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### **4.4 Date of cost estimates**

The cost and expenditure estimates used to calculate the avoided distribution costs should be consistent with the information considered as part of the business case approval (or equivalent) for the non-tariff network demand management measure.

Review of information, and revision of estimates (up or down), subsequent to a decision to commit to and implement the non-tariff network demand management measure would be inconsistent with the intention for the avoided distribution costs parameter to reflect the expected change in the future capital and operating costs as a result of the measure. Therefore, while it is conceivable that a period of up to two years could elapse between the business case decision and the Tribunal's consideration of the cost estimates in the context of the D-factor calculation, the avoided distribution costs calculation needs to reflect the state of knowledge at the time of the business decision.

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## **5 Principles and methodology**

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### **5.1 Principles for calculating avoided distribution costs**

DNSP's calculation of avoided distribution costs for the purposes of establishing a cap for recovery of costs for non-tariff demand management measures should be based on the following principles.

- Avoided distribution costs represent the expected change in the present value of future capital and operating costs affected by the non-tariff demand management measures<sup>3</sup>. The expected change in the present value is calculated by comparing the present values of expected capital expenditure and operating cost cashflows with and without the non-tariff demand management measures (all other things being equal) over the time period.
- All components of expenditure which will be clearly affected by the non-tariff demand management measures should be included.
- Estimates of future capital expenditure and operating costs do not include capital and operating costs of the non-tariff demand management measures.
- Estimates of future capital expenditure and operating costs should be based on the state of knowledge that existed at the time a formal business decision was made to commit to the

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<sup>3</sup> Refer definition in Annexure 1 of Determination – Table 2 of this guideline.

non-tariff demand management measures(s) and should be consistent with the information provided to support the decision.

- The estimates of capital expenditure and operating costs should be based on consistent network planning assumptions, probabilistic or deterministic standards including economic growth, temperature. For example, the DNSPs could use the National Electricity Market Management Company's temperature sensitivity approach as a basis of the calculation, with an assessment of the 90 per cent exceedance (or one in ten years), 50 per cent exceedance and 10 per cent exceedance included as part of the methodology. Estimates of these future cash flows should be linked to defined expected events and specific investments and should be based on objectively supportable data and forecasts.

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## 5.2 Methodology for calculating avoided distribution costs

The calculation of avoided distribution costs for a project should be based on the following formula:

$$ADC_{(t-1)} = PV [CE(base)_{(i)} + OC(base)_{(i)} - CE(DM)_{(i)} - OC(DM)_{(i)}] \text{ [for } i \text{ from } t-1 \text{ to } t+13]$$

Where:

Year t-1 is the year in which the non-tariff demand management costs associated with the measure are first incurred, subject to year t-1 being within the regulatory control period

ADC is the avoided distribution costs expressed in real \$(t-1)

PV is the present value (as defined in the determination), expressed in real\$(t-1)

At the time of commitment to the non-tariff demand management measure:

- CE(base) is the forecast DNSP network capital expenditure (for all components of expenditure considered in CE(DM)) for year i without undertaking the non-tariff demand management measure
- OC(base) is the forecast DNSP network operating costs for year i (for all components of expenditure considered in OC(DM)) for year i without undertaking the non-tariff demand management measure
- CE(DM) is the forecast DNSP network capital expenditure for year i for all components of expenditure affected by undertaking non-tariff demand management measure
- OC(DM) is the forecast DNSP network operating costs for year i for all components of expenditure affected by undertaking the non-tariff demand management measure.

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## 6 Examples

The details of calculating the estimate of the avoided distribution costs will vary considerably between projects. The following examples have been developed to indicate the range of projects that may give rise to avoided distribution costs and to provide examples of how the avoided distribution costs could be estimated in each case.

## 6.1 Castle Hill programme

The Castle Hill case study concerns Integral Energy's network constraint in the Castle Hill area. Peak demand was forecast to rise beyond acceptable network capacity and action was required before 2005. In conjunction with Sustainable Energy Development Authority, Integral Energy sought demand management options that could defer the need to invest in additional network capacity for up to three years. Without demand management, network augmentation costing \$3.2 million was required. A number of possible demand management projects were identified, focussing on efficiency and control improvements with major end-users in the Castle Hill supply area.

Table 4 shows the relevant capital expenditure and operating cost cashflows for Castle Hill with and without the non-tariff demand management measure. The calculated "avoided distribution cost" in this example is \$749,000 in \$2004/05.

**Table 4 – Castle Hill simplified example**

Year	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/1	2011/2	2012/3	2013/4	2014/5	2015/6	2016/7	2017/8	2018/9
Network Determination Period			t-1	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8	t+9	t+10	t+11	t+12	t+13
			Current			Next					Next + 1						
<b>Without DM</b>																	
Capital expenditure (\$'000)			2,000	1,200													
Operating costs (\$'000)			40	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Total relevant cashflows (\$'000)			2,040	1,264	64	64	64	64	64	64	64	64	64	64	64	64	64
<b>With DM</b>																	
Capital expenditure (\$'000)						2,000	1,200										
Operating costs (\$'000)						40	64	64	64	64	64	64	64	64	64	64	64
Total relevant cashflows (\$'000)						2,040	1,264	64	64	64	64	64	64	64	64	64	64
<b>Calculation of Avoided Distribution Costs for D-factor</b>																	
Difference in cashflows (\$'000)			2,040	1,264	64	(1,976)	(1,200)	0	0	0	0	0	0	0	0	0	0
Avoided Distribution Costs (PV) (\$'000)			749														

## 6.2 Initiative which defers current and future capital expenditure

Table 5 illustrates how avoided distribution costs would be calculated in a situation where the non-tariff demand management measure results in deferral of a portion of capital expenditure inside the current regulatory period and a further deferral in the next regulatory period. Because the measure directly results in the two deferrals, the benefit of the future deferral is also captured and taken into account in the calculation of avoided distribution costs.

**Table 5 – Example of one-year deferral in current and future regulatory period**

Year	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/1	2011/2	2012/3	2013/4	2014/5	2015/6	2016/7	2017/8	2018/9
Network Determination Period			t-1	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8	t+9	t+10	t+11	t+12	t+13
			Current			Next					Next + 1						
<b>Without DM</b>																	
Capital expenditure (\$'000)			5,000					5,000									
Operating costs (\$'000)				100	100	100	100	100	200	200	200	200	200	200	200	200	200
Total relevant cashflows (\$'000)			5,000	100	100	100	100	5,100	200	200	200	200	200	200	200	200	200
<b>With DM</b>																	
Capital expenditure (\$'000)				5,000					5,000								
Operating costs (\$'000)					100	100	100	100	100	200	200	200	200	200	200	200	200
Total relevant cashflows (\$'000)				5,000	100	100	100	100	5,100	200	200	200	200	200	200	200	200
<b>Calculation of Avoided Distribution Costs for D-factor</b>																	
Difference in cashflows (\$'000)			5,000	(4,900)	0	0	0	5,000	(4,900)	0	0	0	0	0	0	0	0
Avoided Distribution Costs (PV) (\$'000)			720														

### 6.3 Initiative which defers current capital expenditure by two years

Table 6 illustrates how avoided distribution costs would be calculated in a situation where the non-tariff demand management measure results in deferral of capital expenditure by two years within the current regulatory period.

**Table 6 – Example of two-year deferral in current regulatory period**

Year	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/2	2012/3	2013/4	2014/5	2015/6	2016/7	2017/8	2018/9
			t-1	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8	t+9	t+10	t+11	t+12	t+13
Network Determination Period			Current					Next					Next + 1				
<b>Without DM</b>																	
Capital expenditure (\$'000)			10,000														
Operating costs (\$'000)				200	200	200	200	200	200	200	200	200	200	200	200	200	200
Total relevant cashflows (\$'000)			10,000	200	200	200	200	200	200	200	200	200	200	200	200	200	200
<b>With DM</b>																	
Capital expenditure (\$'000)					10,000												
Operating costs (\$'000)						200	200	200	200	200	200	200	200	200	200	200	200
Total relevant cashflows (\$'000)					10,000	200	200	200	200	200	200	200	200	200	200	200	200
<b>Calculation of Avoided Distribution Costs for D-factor</b>																	
Difference in cashflows (\$'000)			10,000	200	(9,800)	0	0	0	0	0	0	0	0	0	0	0	0
Avoided Distribution Costs (PV) (\$'000)			1,627														

## 7 D Factor approval process – avoided distribution costs

### 7.1 The Tribunal's determination

Table 7 sets out extracts from the Tribunal's determination on the Tribunal's approval process for determining the avoided distribution costs:

**Table 7 – Determination references to the process for determining avoided distribution costs**

Reference	Details
<b>Section 11.1, annual submission of demand management information</b>	<p>On or before the first of February immediately prior to submitting its Annual Pricing Proposal to the Tribunal for each Year of the Regulatory Control Period under clause 12 (the Year t+1 for the purposes of this clause 11), each DNSP must submit to the Tribunal the following information:</p> <p>(a) a detailed description of any Non-Tariff Demand Management Measures, undertaken by the DNSP during the Year t-1 including (for each measure) its characteristics, the capital expenditure and operating costs to be deferred as a result of the measure and any reasonable alternatives to the measure;</p> <p>...</p> <p>(e) reasonable estimates of ...</p> <p>(2) the DNSP's Avoided Distribution Costs resulting from each of those measures;</p> <p>...</p> <p>(f) details of the basis for those estimates (including any assumptions underlying them);</p>
<b>Section 11.2, Assessment and approval by the</b>	<p>(a)...</p> <p>(b) The Tribunal will assess whether the estimates of Foregone Revenue and <b>Avoided</b></p>

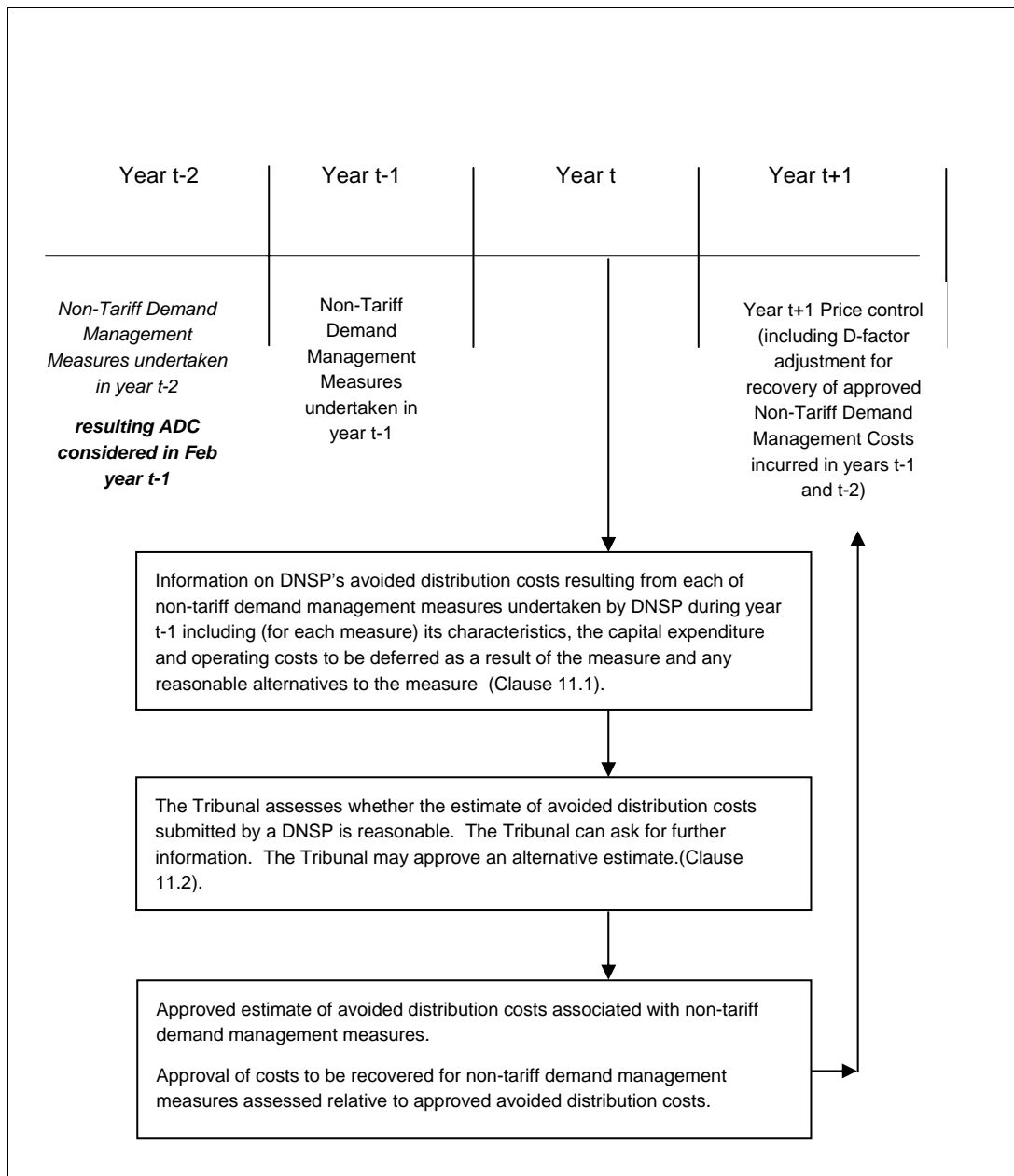


<b>Tribunal</b>	<p><b>Distribution Costs</b> submitted by a DNSP under this clause 11 and the estimated amount submitted under clause 11.1(g) are reasonable, having regard (without limitation) to the information provided by the DNSP under this clause 11.</p> <p>(c) If the Tribunal considers that a cost or estimate provided under this clause 11 is incomplete, inconsistent or unsubstantiated in any way, then the Tribunal may request additional information or request that the DNSP revise and resubmit that cost or estimate.</p> <p>(d) If the Tribunal considers that the costs and estimates provided under this clause 11 are reasonable it will approve them by notice in writing issued to the DNSP.</p> <p>(e) If the Tribunal considers that any of the costs or estimates provided under this clause 11 are unreasonable then the Tribunal may approve (at its own discretion) alternative costs or alternative estimates (as the case may be) for the purposes of this clause 11.2.</p>
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A key aspect that the Tribunal can consider in assessing the "reasonableness" of avoided distribution costs submitted under section 11.2 of the Tribunal's determination is whether the demand management services have been subject to an open competitive procurement process.

## 7.2 Schematic of the Tribunal's approval process

D factor adjustments are considered in year t for prices to apply in year t+1. The information on which D factor adjustments are decided by the Tribunal is provided by 1 February in year t.



### 7.3 Example of the approval process

The example in table 8 considers the D-factor adjustments for a single project (DM1).

**Table 8 - D factor revenues approval and recognition in the 2004-09 regulatory period**

		Regulatory period 2004-09				
Regulatory Year	t-2	t-1	t	t+1	t+2	t+3
Year		2004/05	2005/06	2006/07	2007/08	2008/09
<b>Non-tariff demand management measure – Planning and calculation of avoided distribution costs</b>						
Forecast CE(base), OC(base), CE(DM), and OE(DM) associated with DM1 - ADC(DM1)	DNSP to calculate ADC(DM1) for planning	ADC(DM1) calculated				
<b>Non-tariff demand management measure – Actual costs of implementing measure</b>						
Costs incurred		DMC <sub>t-1</sub>	DMC <sub>t</sub>	DMC <sub>t+1</sub>		
<b>Applying for recovery of costs associated with non-tariff demand management measure</b>						
<b>Establishing ADC cap for recovery of non-tariff demand management costs</b>						
Application to the Tribunal for ADC(DM1)			Apply Feb 06 for ADC(DM1)			
Approval by the Tribunal of ADC(DM1)			Approval of ADC(DM1)			
<b>Applying for recovery of non-tariff demand management costs</b>						
Apply to the Tribunal for recovery of real costs for non-tariff demand management measures for DM1			Apply Feb 06 for DMC <sub>t-1</sub>	Apply Feb 07 for DMC <sub>t</sub>	Apply Feb 08 for DMC <sub>t+1</sub>	NA
Approval by the Tribunal of DMC			Approval of DMC <sub>t-1</sub>	Approval of DMC <sub>t</sub> , provided DMC <sub>t</sub> <ADC(DM1)-DMC <sub>t-1</sub>	Approval of DMC <sub>t+1</sub> , provided DMC <sub>t+1</sub> <ADC(DM1)-(DMC <sub>t</sub> +DMC <sub>t-1</sub> )	NA
<b>Recovery of costs through D-factor adjustment to prices</b>						
D-Factor recovery				Adjustment for DMC <sub>t-1</sub>	Adjustment for DMC <sub>t</sub>	Adjustment for DMC <sub>t+1</sub>

The example shows that the non-tariff demand management measure costs incurred in 2004/05 are considered by the Tribunal in 2005/06 (February 2006), with prices adjusted through the D-factor in 2006/07.